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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/780,632	02/09/2001	Surinder M. Maini	HT-3765 US NA	9350

23906 7590 01/30/2003

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EXAMINER

BOYD, JENNIFER A

ART UNIT PAPER NUMBER

1771

DATE MAILED: 01/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/780 632

Examiner

Jennifer A Boyd

Applicant(s)

MAINI, SURINDER M

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication. If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely. If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication. Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 09 February 2001
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☐ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 8, 9 and 19-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-7 and 10-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f):  
a) ☐ All b) ☐ Some \* c) ☐ None of  
1 ☐ Certified copies of the priority documents have been received.  
2 ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3 ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application):  
a) ☐ The translation of the foreign language provisional application has been received.

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### DETAILED ACTION

1. The election of claims 1 - 7 and 10 - 18 in response to the Restriction Requirement sent on November 11, 2002 has been entered. Claims 8 - 9 and 19 - 21 have been withdrawn.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 - 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunbar (US 5,397,627).

As to claim 1, Dunbar teaches a woven fabric including at least one multi-filament yarn (Abstract). The yarn includes a plurality of sections at which the individual filaments are entangled together to form entanglements and a plurality of sections wherein the individual filaments are substantially parallel to the longitudinal axis of the yarn. The multifilament yarn has at least one type of high strength filament selected from the group consisting of extended chain polyethylene filament, polyvinyl alcohol filament, polyacrylonitrile filament, liquid crystal filament, glass filament and carbon filament. If two different filaments are chosen from the above group, the two components would have different shrinkage characteristics.

As to claim 1, although Dunbar does not explicitly teach the claimed limiting oxygen

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than 21 is inherent to Dunbar. Support for said presumption is found in the use of like materials (i.e. a woven fabric with co-mingled bundle of two types of continuous filaments having different shrinkage characteristics) which would result in the claimed property. The burden is upon the Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed property of a limiting oxygen index of greater than 21 would obviously have been present once the Dunbar product is provided. Note *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977). In the present invention, one would have been motivated to create a woven garment with low flammability polymer, thus a low limiting oxygen index, in order to properly protect the wearer.

As to claims 1 and 2, Dunbar discloses the claimed invention except for the random entangled loop structure has a weight per unit length of the yarn being 3 to 25 percent higher as required by claim 1 and 10 to 18 percent higher as required by claim 2 than a continuous filament yarn having the same composition but no entanglement or loops. It should be noted that the proportion of random entangled loop structure is a result effective variable. For example, the higher percentage of random entangled loop structure present, the total fabric weight will decrease. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a random entangled loop structure having a weight per unit length of the yarn being 3 to 25 percent higher as required by claim 1 and 10 to 18 percent higher as required by claim 2 than a continuous filament yarn having the same composition but no entanglement or loops, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ

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weight per unit length of the yarn proportions of entangled loop structure in order to create a light-weight but properly heat resistant fabric.

As to claim 6, Dunbar teaches that the woven fabric can be a plain weave pattern (column 7, lines 43 - 45).

As to claim 7, Dunbar teaches that the woven fabric can be a twill weave pattern (column 7, lines 43 - 45).

4. Claims 10 - 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunbar (US 5,397,627) in view of Hartmanns et al. (US 5,399,418).

As to claim 10, Dunbar teaches a woven fabric including at least one multi-filament yarn (Abstract). The yarn includes a plurality of sections at which the individual filaments are entangled together to form entanglements and a plurality of sections wherein the individual filaments are substantially parallel to the longitudinal axis of the yarn. The multifilament yarn has at least one type of high strength filament selected from the group consisting of extended chain polyethylene filament, polyvinyl alcohol filament, polyacrylonitrile filament, liquid crystal filament, glass filament and carbon filament. If two different filaments are chosen from the above group, the two components would have different shrinkage characteristics.

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As to claims 10, 16, 17 and 18, Dunbar discloses that at least one multifilament yarn is made of high strength filaments having a tenacity of at least about 7 g d, a tensile modulus of at least about 150 g d and an energy-to-break of at least 8 J/g (column 2, lines 10 - 30).

Dunbar fails to disclose that the multi-filament yarns are made of a combination of poly(paraphenylene terephthalamide) filaments and poly(metaphenylene isophthalamide) filaments.

Hartmanns et al. teaches a multi-ply textile fabric used for making a protective garment (Abstract). One type of yarn used within the textile fabric is a 20% NOMEX (poly-metaphenylene isophthalamide) "Delta A" 80% KEVLAR (poly-paraphenylene terephthalamide) 29-multifilament yarn. (column 6, lines 47 - 50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the yarn of Hartmanns in the fabric of Dunbar motivated by the expectation to meet the high strength, tensile modulus and energy-to-break requirements of Dunbar while creating a strong and highly heat resistant fabric.

As to claims 10, 11 and 18, Dunbar in view of Hartmanns discloses the claimed invention except for the random entangled loop structure has a weight per unit length of the yarn being 3 to 25 percent higher as required by claim 10 and 10 to 18 percent higher as required by claim 11 than a continuous filament yarn having the same composition but no entanglement or loops and a mixture of 50% poly(paraphenylene terephthalamide) filaments and 50% poly(metaphenylene isophthalamide) filaments as required by claim 18. It should be noted that the proportion of

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of random entangled loop structure present, the total fabric weight will decrease. As the percentage of Nomex increases, the heat resistance of the yarn increases and as the percentage of Kevlar increases, the strength of the yarn increases. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a random entangled loop structure which has a weight per unit length of the yarn 3 to 25 percent higher as required by claim 10 and 10 to 18 percent higher as required by claim 11 than a continuous filament yarn having the same composition but no entanglement or loops and a mixture of 50% poly(paraphenylene terephthalamide) filaments and 50% poly(metaphenylene isophthalamide) filaments since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In the present invention, one would have been motivated to optimize the weight per unit length of the yarn proportions of entangled loop structure and denier in order to create a light-weight but properly heat resistant fabric. In the present invention, one would have been motivated to optimize the percentage of Nomex and Kevlar in order to properly balance the strength and heat resistance of the yarn.

As to claim 14, Dunbar teaches that the woven fabric can be a plain weave pattern (column 7, lines 43 - 45).

As to claim 15, Dunbar teaches that the woven fabric can be a twill weave pattern (column 7, lines 43 - 45).

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5. Claims 3, 4, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunbar (US 5,397,627) in view of Hartmanns et al. (US 5,399,418) and Harpell et al. (US 5,185,195).

Dunbar in view of Hartmanns fails to teach the linear density of a multi-filament yarn comprising (poly-paraphenylene terephthalamide) and (poly-metaphenylene isophthalamide) filaments.

Harpell teaches a garment having improved penetration resistance which can comprise aramid fibers such as Kevlar (poly-paraphenylene terephthalamide) and Nomex (poly-metaphenylene isophthalamide) (column 11, lines 26 - 46). Harpell teaches that the yarn used in the garment has a linear density in the preferred range of 10 to about a 1000 denier (column 7, lines 9 - 15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to create a multi-filament yarn containing both (poly-paraphenylene terephthalamide) and (poly-metaphenylene isophthalamide) motivated by the expectation to have a proper balance of heat resistance provided by (poly-metaphenylene isophthalamide) and strength provided by (poly-paraphenylene terephthalamide). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the aramid fibers with the specified linear density range of Harpell in the woven fabric of Dunbar in view of Hartmanns motivated by the expectation to create a very strong and durable fabric.

As to claim 5, the features of the patent are set forth above.



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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A Boyd whose telephone number is 703-305-7082. The examiner can normally be reached on Monday thru Friday (8:30am - 6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on 703-308-2414. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

*Jennifer Boyd*

Jennifer Boyd  
January 23, 2003